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CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

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SUBJECT New Process Developed for Production of Phosphate Fertilizers

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[redacted]

1. The secret process for the new "calcium-magnesium-phosphate" developed in the DDR is as follows (this process is going to be used on a large scale):

   a. 47 parts of "Kola-Konzentrat" phosphate rock* (natural Cola Peninsula rock which has been ground to a fine meal and concentrated by flotation to give a material of 38% phosphorus pentoxide, P_2O_5)

   b. 47 parts of "Kieserit" (98% magnesium sulfate, $MgSO_4$) and

   c. 9 parts of rock salt (98% sodium chloride, NaCl)

   are placed in a revolving cylindrical furnace lying at an angle of 5° to the horizontal.

2. After initial mixing of the materials, the furnace is heated to 900°C by an open gas flame or by other means. During the heating process, the magnesium sulfate elucidates phosphorics (sic) until they have the necessary soluble form for agricultural purposes.

3. The greatest advantages of this new system are that Russian phosphate rock can be used and no sulphuric acid is required.** Another phosphate fertilizer process, using phosphate rock in a smelting process with a potassium compound called "Alcid-Phosphate" (sic)*** has been abandoned because it did not work.

4. A plant at Rüdersdorf using the new process has been completed and has been in operation for a number of weeks. Difficulty has been experienced with the lining of the furnaces and a new, more reliable coating is being substituted in them. The Rüdersdorf plant was designed for a calcium-magnesium-phosphate fertilizer output of 12,000 tons per annum, computed as P_2O_5. Along with the Heinrichshall and Oranienburg plants which use the same process, the Rüdersdorf plant is to be enlarged as part of the Five-Year-Plan. Present production and planned future capacities for phosphate fertilizer manufacture in the DDR are as follows:

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STATE	X	NAVY	X	NSRB	DISTRIBUTION		
ARMY	X	AIR	X	FBI	OST	EV	

Plant	Product	Working Capacity (% Max.)	Max. Capacity (tons as P_2O_5)	Projected Future Capacity (tons as P_2O_5)
Alcid, Coswig	Superphosphate	40%	12,000	12,000
Alcid, Salzwedel	"	50%	10,000	10,000
Organa, Magdeburg S.O.	"	35%	10,000	10,000
VEB Draschwitz-Reuden	"	40%	5,000	5,000
Jul. Grosse, Oschersleben	"	50%	5,000	5,000
Alcid, Rüdersdorf	Calcium-Magnesium-Phosphate	0%	12,000	60,000
Alcid, Oranienburg	"	-	-	20,000
Alcid, Heinrichshall	"	100%	4,000	12,000
			58,000	134,000

5. DDR yearly requirements for phosphate fertilizer range from a minimum of 150,000 tons to an optimum of 230,000 tons, computed as P_2O_5. Accordingly, the DDR phosphate fertilizer industry will be well on its way to fulfilling ultimate needs when the planned expansion program is completed.

* 25X1A [redacted] Comment: Possibly potassium acid phosphate KH_2PO_4.

** 25X1A [redacted] Comment: Ordinarily, insoluble phosphate rock is solubilized for use as fertilizer by treating it with sulfuric acid to form more readily soluble superphosphate and gypsum, as:

$$Ca_3(PO_4)_2 + 2H_2SO_4 + 5H_2O = CaH_4(PO_4)_2 \cdot H_2O + 2\,CaSO_4 \cdot 2H_2O \text{ superphosphate.}$$

The exact reaction which occurs between the magnesium sulfate and calcium triphosphate in the furnace fusion process described here is not clear. Possibly a calcium magnesium phosphate complex is formed $[(CaMg)_3(PO_4)_4]_x$ in which the phosphate is more readily available. The sodium chloride is evidently added as a flux.

*** 25X1A [redacted] Comment: Possibly potassium acid phosphate, KH_2PO_4.